

Appl. No. 09/783,377

### **REMARKS**

Claims 1-20 and 29-31 are cancelled. New claims 32-34 are added. Claims 21-28 and 32-34 are pending in the application.

The specification has been amended to correct typographical errors.

Applicant hereby affirms the provisional election made without traverse on April 17, 2002 to prosecute the invention of group II (claims 21-28). Claims 1-20 and 29-31 are cancelled accordingly.

Claims 21 and 22 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Dunlop et al., U.S. Patent No. 5,809,393. The Examiner is reminded by direction to MPEP § 2131 that anticipation requires each and every element of the claim to be disclosed in a single prior art reference. Claims 21 and 22 are allowable over Dunlop for at least the reason that Dunlop fails to disclose each and every limitation in either of those claims.

Independent claim 21 recites a physical vapor deposition target consisting essentially of aluminum and less than or equal to 1000 ppm of one or more dopant materials comprising recited elements, the physical vapor deposition target having an average grain size of less than 100 microns. The Examiner states at page 4 of the present action that the claimed dopant range of less than 1000 ppm is anticipated by Dunlop because Dunlop discloses an aluminum sputtering target that may contain amounts of up to 10 weight percent of specified elements. However, as set forth in the MPEP at § 2131.03, anticipation of a claim requires the reference to disclose the claimed subject matter with "sufficient specificity to constitute anticipation under the statute". Where no specific examples falling within the claimed range are disclosed in the reference, anticipation must be determined on a case to case basis. Section 2131.03 further states

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that if the reference discloses a broad range and the claims are directed to a narrower range, and there is evidence of unexpected results, "it may be reasonable to conclude that the narrow range is not disclosed with sufficient specificity" to constitute anticipation.

The content range of added elements of up to 10 weight percent as disclosed in Dunlop is broad relative to the claim 21 recited content of less than or equal to 1000 ppm of one or more dopant materials. Dunlop does not disclose any examples of materials wherein the specified elements are added to have the claim 21 recited content of less than or equal to 1000 ppm.

The claim 21 recited dopant content confers improvements on materials relative to the cited art. As discussed in the applicant's disclosure at page 3, line 6 through page 4, line 15; page 13, lines 12-18; page 18, lines 20-22; page 19, lines 7-8; page 19, lines 15-25; page 20, lines 18-24; and page 25, lines 16-22, it is advantageous to add the disclosed amount of dopants to enhance the stability of microstructures while avoiding hindering full dynamic recrystallization. As discussed in the locations of the disclosure, the recited dopant content assists in avoiding coarsening of structure and allows improved refinement which is important for target performance and also allows large target sizes. Dunlop fails to provide any specific example of the claim 21 recited dopant content range, and the recited range confers improvements over the Dunlop disclosure. Accordingly, the Dunlop disclosure does not anticipate the claim 21 recited physical vapor deposition target having less than or equal to 1000 ppm of one or more dopant materials comprising elements selected from the recited group, and claim 21 is allowable.

Dependent claim 22 is allowable over Dunlop for at least the reason that it depends from allowable base claim 21.

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Claims 23-28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Dunlop in view of Ueda et al., U.S. Patent No. 5,541,007. The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine references teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Claims 23-28 are allowable over Dunlop in view of Ueda for at least the reason that the references, individually or as combined, fail to teach or suggest each and every limitation in any of those claims.

As discussed above, Dunlop does not teach the claim 21 recited dopant material content of less than or equal to 1000 ppm. Additionally, since the claim 21 recited dopant material content confers specific advantages, claim 21 is not rendered obvious by Dunlop. As noted above, independent claim 1 further recites that the physical vapor deposition target has an average grain size than less than 100 microns. Ueda specifically discloses a material having an average grain size of from 0.1 to 0.5 millimeters (col 3, lns 13-14). Ueda does not disclose or suggest the claim 21 recited physical vapor deposition target containing less than or equal to 1000 ppm of one or more dopant materials and having an average grain size of less than 100 microns. As combined, Dunlop and Ueda fail to disclose or suggest the claim 21 recited less than or equal to 100 ppm of dopant materials combined with an average grain size of less than 100 microns. Accordingly, independent claim 21 is not rendered obvious by the combination of Dunlop and Ueda and is allowable over these references.

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Dependent claims 23-28 are allowable over the combination of Dunlop and Ueda for at least the reason that they depend from allowable base claim 21.

New claims 32-34 do not add "new matter" to the application since each is fully supported by the specification as originally filed. Independent claim 32 is supported by the specification at, for example, page 15, lines 16-17; page 16, lines 7-10; Fig. 8; page 21, lines 1-9; Examples 1-3; and the claims as originally filed. Dependent claim 33 is supported by the specification at, for example, page 16, lines 4-7; page 18, line 24 through page 19, line 1; and page 25, lines 16-22. Dependent claim 34 is supported by the specification at, for example, page 21, lines 10-22; page 8, lines 9-10 and page 16, lines 2-3.

For the reasons discussed above claims 21-28 are allowable and claims 32-34 are believed allowable. Accordingly, applicant respectfully requests formal allowance of claims 21-28 and 32-34 in the Examiner's next action.

Respectfully submitted,

Dated: 7/24/2002

By: \_\_\_\_\_

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Application Serial No. .... 09/783,377  
Filing Date ..... February 13, 2001  
Inventor..... Segal et al.  
Assignee..... Honeywell International Inc.  
Group Art Unit..... 1742  
Examiner ..... Wessman, Andrew E.  
Attorney's Docket No. .... 30-5022(4015)  
Title: Methods of Forming Aluminum-Comprising Physical Vapor Deposition Targets;  
Sputtered Films; and Target Constructions

**VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING  
RESPONSE TO APRIL 25, 2002 OFFICE ACTION**

**In the Specification**

The replacement specification paragraphs incorporate the following amendments.

Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

The paragraph beginning at line 25 on page 10 has been amended as follows:

A deformation technique known as equal channel angular extrusion (ECAE) is used with advantage for the manufacture of physical vapor deposition targets, and in particular aspects of the invention is utilized for the first time in the manufacture of FPD and LCD targets. The ECAE technique was developed by V.M. Segal, and is described in US Patents Nos. 5,400,633; 5,513,512; 5,600,989; and ~~5,590,390~~ 5,590,389. The disclosure of the aforementioned patents is expressly incorporated herein by reference.

The paragraph beginning at line 4 on page 16 has been amended as follows:

Particular embodiments of the present invention pertain to formation of aluminum-comprising physical vapor deposition targets, such as, for example, formation of aluminum-comprising physical vapor deposition targets suitable for liquid crystal display

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(LCD) applications. Fig. 8 shows a flow-chart diagram of an exemplary process of the present invention. In a first step, an aluminum-comprising cast ingot is formed, and in a second step the ingot is subjected to thermo-mechanical processing. The material resulting from the thermo-mechanical processing is an aluminum-comprising mass. The mass is subsequently deformed by equal channel angular extrusion (ECAE). Such deformation can be accomplished by one or more passes through an ECAE apparatus. Exemplary ECAE apparatuses are described in U.S. Patent No.'s. 5,400,633; 5,513,512; 5,600,989; and ~~5,590,390~~ 5,590,389. The aluminum-comprising mass can consist of aluminum, or can consist essentially of aluminum. The mass preferably comprises at least 99.99% aluminum. The mass can further comprise less than or equal to about 100 parts per million (ppm) of one or more dopant materials comprising elements selected from the group consisting of Ac, Ag, As, B, Ba, Be, Bi, C, Ca, Cd, Ce, Co, Cr, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ge, Hf, Ho, In, Ir, La, Lu, Mg, Mn, Mo, N, Nb, Nd, Ni, O, Os, P, Pb, Pd, Pm, Po, Pr, Pt, Pu, Ra, Rf, Rh, Ru, S, Sb, Sc, Se, Si, Sm, Sn, Sr, Ta, Tb, Te, Ti, Tl, Tm, V, W, Y, Yb, Zn and Zr. The aluminum-comprising mass can consist of aluminum with less than or equal to about 100 ppm of one or more of the dopant materials described above, or consist essentially of aluminum with less than or equal to about 100 ppm of one or more of the dopant materials described above.

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**In th Claims**

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

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